JUSTIFICATION FOR OTHER THAN FULL AND OPEN COMPETITION (JOFOC)
(In accordance with Federal Acquisition Regulation (FAR) 6.3 – Other than Full and Open Competition)

1. **This document is a justification for other than full and open competition prepared by NASA's Goddard Space Flight Center (NASA's GSFC):**

The procuring agency is the National Aeronautics and Space Administration (NASA) and the contracting activity is NASA's Goddard Space Flight Center (GSFC).

2. **The nature and/or description of the action being approved:**

GSFC proposes to award a cost reimbursement contract to the Center for International Earth Science Information Network (CIESIN) of the Earth Institute at Columbia University Lamont-Doherty Earth Observatory for the continued development and operation of the Socioeconomic Data and Application Center (SEDAC) as a Distributed Active Archive Center (DAAC) for NASA's Earth Observing System Data and Information System (EOSDIS). This contract is for the continued operation and maintenance of the SEDAC DAAC to perform data acquisition, application development of socioeconomic data, product generation, archive, distribution, user services, maintenance, and operation of the systems and related science support activities

3. **Description of the supplies or services required, including an estimated value:**

NASA has established, under its Earth Science program, EOSDIS, a comprehensive data system which manages the data from Earth science research satellites and field measurement programs. The SEDAC DAAC is one element of EOSDIS.

The SEDAC DAAC is part of an established program of scientific research, academic involvement and education outreach at the University. As an institutional element within EOSDIS, SEDAC was created to provide products and services for policy formulation and decision making which combined Earth science and socioeconomic data, as well as improve the exchange of data and information between Earth science and socioeconomic data users. To perform this function, SEDAC utilizes data from NASA's Earth science research satellites as well as other government and private sector programs. Using this data, SEDAC develops and manages geospatial data and information products which further the understanding of the Earth as a system and enhances the interaction between scientific efforts at NASA and those at other agencies, as well as communication with the public and social science communities. SEDAC works with other EOSDIS data centers, which provide operational data and information services for other disciplines, and are a source of products that are useful for socioeconomic research applications.

SEDAC information services will be available to all interested users from any community through a sustained and expanded information gateway established between Earth science and socioeconomic science communities.

The anticipated follow-on contract will include the following requirements:

- Information and data system management : software and system development necessary to support the socioeconomic data and applications
- Sustaining and expanding the existing information gateway between Earth science and socioeconomic science communities
- Sustaining a granule-based inventory for socioeconomic data archived and distributed by SEDAC
- Ensuring the long-term integrity and viability of the data products SEDAC generates or holds
- Dataset acquisition and applications development to include documentation, guides, metadata, and incorporation into SEDAC holdings, as well as populating the Global Change Master Directory and the EOS Clearing House, a repository of NASA Earth science metadata
- Electronic distribution of data and products in formats consistent with the user's needs
- User Services for SEDAC data products and for users attempting to overcome obstacles to analyses presented by the organization of the data

The tasks assigned to the socioeconomic data and applications DAAC under the subject contract include socioeconomic data acquisition and applications development, system development, operations and maintenance, and user support. These tasks include identifying and making available sources of socioeconomic data and applications, supporting development and generation of new information products and services oriented to researchers who utilize these data, and providing these information products and services to a spectrum of users, including fundamental and applied researchers, operational users, and the general public.

This contract is a 5-year follow-on contract with Columbia University. The estimated value of the contract is approximately [redacted]

4. Statutory authority permitting other than full and open competition:
The statutory authority permitting other than full and open competition is 10 U.S.C. 2304(c)(3), as implemented by FAR 6.302-3, Industrial mobilization; engineering, developmental, or research capability; or expert services.

More specifically, FAR 6.302-3(a)(2)(ii), provides that full and open competition need not be provided for when it is necessary to award a contract to a particular source in order to establish or maintain an essential engineering, research, or development capability to be provided by an educational or other nonprofit institution or a federally funded research and development center.

5. A demonstration that the proposed contractor's unique qualifications or the nature of the acquisition requires use of the authority cited:

The rationale supporting the use of FAR 6.302-3(a)(2)(ii) is the maintenance of essential engineering capabilities, as described below, by an educational institution, Columbia University.

According to FAR 6.302-3(b)(2)(ii), the use of the authority at (a)(2)(ii) is appropriate when it is necessary to establish or maintain an essential capability for engineering or developmental work calling for the practical application of investigative findings and theories of a scientific or technical nature.

Under this criterion, the capability is being maintained, not established, since GSFC has contracted with Columbia University for this capability since 1998.

Capabilities

The CIESIN staff comprises a mix of scientific researchers, economists, and engineers with specialties, at the PhD and Masters level, in computer engineering and database design, social engineering, and social scientific theory, and economic policy. Because of their unique blending of social scientists with computer engineers, CIESIN has a unique capability to take the remotely sensed data from NASA satellites and combine it with socioeconomic data, including population information and other statistical data gathered by governments and agencies around the world. Through this combination, researchers and policy analysts can more fully understand the human dimensions impact of global climate change, including the impact of changes on populations and the impact of human populations on the climate system.

Essential Nature of these Capabilities

The aforementioned capabilities are essential to NASA in that they are necessary to fulfill NASA's needs in the area of socioeconomic research. Without them, NASA and scientific researchers will be deprived of important scientific data.

These skills are necessary to continue to develop and improve socioeconomic algorithms for geospatial applications and the production of research quality data products to meet science objectives for NASA. By improving the usefulness of socioeconomic data, NASA has a greater ability, for example, to forecast and assess risks of changes in the environment to world population.

CIESIN scientists and data managers are internationally recognized as a source of information about socioeconomic data. The CIESIN is widely known for its expertise in acquiring socioeconomic data as well as complementary earth science datasets, processing and gridding this data to create higher level geospatial informational products in formats, and managing and disseminating these data and products effectively and efficiently to the user community.

At GSFC, there is a lack of available specific expertise in socioeconomic data analysis. NASA has affirmatively designated the SEDAC DAAC, among eight other discipline-specific data centers, to be the entity which provides state-of-the-art data products for socioeconomic research. Without these skills, GSFC would be unable to meet needs of the EOSDIS in the area of socioeconomic research. NASA would be unable to continue to develop and disseminate, for example, the following datasets:

- The Gridded Population of the World Version 3 dataset
- The Global Rural-Urban Mapping Project collection
- The Projected Population Distribution 2015
- The Population, Landscape, and Climate Estimates dataset
- The Environmental Performance Index and Pilot Trend Environmental Performance Index, 2012 Release (2000–2010)
- The Low-Elevation Coastal Zone data
- The Natural Disasters Hotspots
- The Poverty Mapping Data
- NASA's Human Appropriation of Net Primary Productivity dataset
- The Environmental Sustainability Index and Environmental Performance Index

- The spatial data services and layers currently available via Open Geospatial Consortium specifications

NASA must maintain this essential capability for socioeconomic expertise and the practical application of such data for use in scientific theories and technological development.

Columbia University Contract is Necessary to Maintain the Capability

The contract is necessary for CIESIN to maintain this capability. Beginning in 1998, the SEDAC has been supported solely through three five-year NASA contracts with the Columbia University. Without the contract to continue the work, there would be no means by which the skills would be retained beyond the end of the current contract on July 31, 2013. There are currently no other entities providing funding (through grants, contracts, or otherwise) to support the SEDAC DAAC, which would assure the continuation of the facility if the contract were to end. It is also unlikely that the University would take over the functions currently funded by NASA if the contract were to end. This is unlikely due to large commitment of resources required to operate the facility. The only way for the facility to continue in operation at this time is for NASA to continue to contract with the facility. As stated above, the estimated value of NASA's contract with CIESIN is [redacted] Hence, it is clear that without this contract the skills necessary to do the work would be in serious jeopardy.

NASA has, for 15 years, relied on CIESIN for the acquisition, archiving, transformation, validation and distribution of socioeconomic data and applications. This pre-existing capability must be maintained in order for NASA to continue to provide for research in this important area. NASA could identify no other institution to provide this capability.

Experience and Expertise

Throughout the prior contract, CIESIN has demonstrated its capabilities to accomplish the work necessary for successful achievement of NASA's science programs.

CIESIN has been competitively awarded several grants through NASA Announcements of Opportunities based on its expertise in defining socioeconomic data sets. A recent example includes "Using Satellite Data to Develop Environmental Indicators." This effort explored possible satellite remote sensing data sources and policy needs with respect to indicators of air quality, biomass burning, and coastal water quality.

CIESIN's data management expertise, coupled with its socioeconomic science expertise and experience, distinguish this Columbia University facility from other potential sources having data and information capabilities. The combination of the institutional elements with an active science community makes the Columbia University facility a unique location, both nationally and internationally, for socioeconomic research and data applications.

A unique organizational strength that CIESIN has is in the number of prominent scientists in the field of socioeconomic science and applications working at the facility, and the close affiliation with other national socioeconomic scientists on the SEDAC DAAC User Working Group. CIESIN has affiliated scientists covering the mission areas of population, land use and emissions, environmental treaties and resource indicators, socioeconomic model visualization and analysis, environment & health, hazard vulnerability assessment, environmental sustainability, poverty & food security and socioeconomic information useful for

geospatial analyses and applications. The CIESIN has direct contact with a group of these research scientists who interact on data management and data set priority issues. No other institution was identified by GSFC to have similar experience and expertise.

Over the past 12 months CIESIN-affiliated scientists have authored a range of papers regarding socioeconomic data and applications. These papers have been published in leading technical journals and many have also been delivered at several prominent conferences, meetings and workshops worldwide such as: the American Geophysical Union (AGU) meeting; National Climate Assessment Workshops; the Environmental Performance Index workshop; Earth Science Information Partners Federation meetings; the Global Earth Observation System of Systems Workshop XLIII on Sharing Climate Information and Knowledge; the First International Council for Science World Data System Conference; and numerous other meetings and workshops geared towards addressing the needs of utilizing both earth science and socioeconomic data in tackling interdisciplinary problems.

CIESIN has also played a leading role in developing guidelines for implementing the Group on Earth Observations Data Sharing Principles, working with International Council for Science Committee on Data for Science and Technology, Creative Commons, and the Global Biodiversity Information Facility on open access data policies and licensing approaches. In addition, the unique capabilities of CIESIN and the other NASA data centers has led to a high level of activity in the US International Polar Year efforts, including the coordination and hosting of the International Polar Year Data and Information System.

CIESIN recently provided support to NASA Headquarters in development of a societal indicators workshop as part of the National Climate Assessment. In this capacity, CIESIN developed a background white paper and other supporting materials for the workshop. CIESIN staff made significant contributions to the resultant National Climate Assessment report entitled *Climate Change Impacts and Responses: Societal Indicators for the National Climate Assessment* (February 2012).

Other Rationale Supporting Award to Columbia University

The alternative to continuing the effort at Columbia University would be to try to develop a similar capability elsewhere. In the unlikely event that another source could be identified that meets the government's minimum requirements, the use of another contractor would require a period of staffing up with its attendant increased programmatic risks and redundant costs [redacted]

NASA has successfully implemented this long-term reliance on the CIESIN facility, in meeting the Nation's requirements, particularly with respect to socioeconomic data. NASA has spent nearly 15 years [redacted] modifying the equipment at the CIESIN facility and increasing the knowledge and expertise in socioeconomic data needed to successfully operate the facility.

Based on the above rationale, NASA's GSFC has determined that this procurement is essential to the maintenance of an essential capability for theoretical analysis, exploratory studies, and engineering work in the receiving, transformation, validation, and distribution of socioeconomic data.

6. **Description of the efforts made to ensure that offers are solicited from as many potential sources as practicable, including whether a notice was or will be publicized as required by Federal Acquisition Regulation (FAR) 5.2:**

A Notice of Intent to award a sole source contract to Columbia University was posted to Federal Business Opportunities on April 4, 2013, with a response due date for capability statements of April 19, 2013. There were no responses received from interested contractors.

7. A determination by the contracting officer that the anticipated cost to the government will be fair and reasonable:

By signature on this document, the contracting officer attests that the anticipated cost to the government will be fair and reasonable. Columbia University will be required to submit a proposal to be evaluated and negotiated by the government. The GSFC contracting officer and the contracting officer's representative will monitor CIESIN's performance. CIESIN will be required to submit technical progress reports and financial management reports to be reviewed and analyzed by the government, and the Defense Contract Audit Agency will review all costs incurred for allowability.

8. Description of the market research conducted and the results or a statement of the reasons market research was not conducted:

A Request for Information (RFI) for this procurement was synopsized in the Federal Business Opportunities (www.fedbizops.gov) on November 6, 2012 with a response date of December 6, 2012.

Two parties responded with statements of capabilities, one commercial company and one academic organization, Columbia University. Both responses were evaluated by the COR and staff expert to determine how well their capabilities aligned with and supported the needs of NASA for operation of the SEDAC requirement. After a thorough review, it was determined that the commercial company is not fully capable of meeting all the government requirements for the SEDAC. The contracting officer contacted the commercial company on May 28, 2013 and informed them that they were deemed incapable. It was also confirmed that the company is no longer interested in this procurement. Columbia University was found to be fully capable of meeting all the government requirements for SEDAC.

Based on the market research, the COR is knowledgeable of all sources closely approximating these capabilities. NASA does not believe any alternate source can take on full control and responsibility without risk of unacceptable and unsuccessful performance.

9. Other facts supporting the use of other than full and open competition:

None

10. Sources, if any, that expressed an interest in writing, in the acquisition:

As stated above, in accordance with requirements of FAR 5.203 (a), a notice of NASA's intent to award a follow-on sole source contract was synopsized on the NASA Acquisition Internet Service (NAIS) and on the Federal Business Opportunities (Fed Biz Opps) websites. The synopsis notified all interested sources that this requirement will be issued on a sole source basis and provided them an opportunity to submit their interest and capabilities. No responses were received upon the expiration of the synopsis.

11. The actions the Agency may take to remove or overcome any barriers to competition before any subsequent acquisition for the supplies or services required:

This authority is used to maintain essential capabilities. The current market research does not indicate that there are any other sources available with facilities and the necessary skill mix to perform this work.

Over the past several years, NASA HQ has released several announcements of opportunities for developing data systems, analysis software and related activities. These opportunities have funded many complementary activities that will support future data center functions. In addition, NASA has taken additional efforts to engage the community in data center and data systems issues. These include:

- Holding conferences to discuss the roles and responsibilities of science operations functions and data systems
- Establishing a library of documentation produced using government funds to make the knowledge (reports, drawings, etc.) available to all potential competitors
- Requiring the current data centers to openly discuss what they are doing, what they have learned, and what they have that is available to others in open forums like the AGU meetings

Socioeconomic Data and Applications Distributed Archive Center for the EOS Data and Information System (EOSDIS)

TECHNICAL DIRECTORATE: I certify that the facts presented in this justification are accurate and complete.

electronic approval — Signature — 5/16/13 — Date

CONTRACTING OFFICER: I certify that this justification is accurate and complete to the best of my knowledge and belief.

S. Paulette Barrett — Signature — 5/17/13 — Date

PROCUREMENT OFFICER: (CONCURRENCE)

Thomas S. Dilg — Signature — 6/4/13 — Date

GSFC COMPETITION ADVOCATE: (CONCURRENCE)

Ruth F. Dalton — Signature — 6/13/13 — Date

GSFC CENTER DIRECTOR: (APPROVAL)

C.J. Scolese — Signature — 24 June 2013 — Date